Changes in the Cost of Bank Equity and the Supply of Bank Credit

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Abstract: This paper shows that both bank balance sheet composition and credit supply significantly respond to a decrease in the relative cost of bank equity. To do so, we exploit the staggered introduction of tax reforms in Europe from 2000 to 2012 as exogenous sources of changes in the cost of equity. We investigate the effect on credit supply using loan level data in a country where firms are not affected by these reforms, and where foreign banks affected by the reforms are lending actively: Germany. We find that the relative decrease in the cost of equity leads banks to rely more on equity financing and to increase lending to firms, while decreasing security and interbank asset holdings. Overall, our paper shows that taxation can be an effective tool to monitor bank leverage and credit supply.

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"When it Rains in Milan or Brussels, Does It Drizzle in Frankfurt?"

The financial crisis of 2007-2008 illustrated how highly leveraged banks which come under distress can generate large negative externalities for the rest of the economy. This has precipitated a vigorous debate on whether or not, and to what extent, capital requirements imposed on banks should be increased (Admati, 2013; Hanson, 2011)

If equity is expensive, increasing capital requirements could lead banks to contract lending, which in turn may negatively affect the real economy. A recent literature empirically shows that tightening capital requirements had such a contractionary impact on bank lending in various settings. However, there is another way to reduce bank leverage than by increasing capital requirements: by decreasing the cost of equity. Such a decrease should, on the margin, increase the relative benefit of issuing equity, thereby reducing bank leverage. Schepens (2016), for example, shows that the introduction in 2006 of a tax reform in Belgium that reduces the cost of equity leads to better capitalized financial institutions.

We address the following questions: Does a decrease in the cost of equity also affect bank lending? And if so, to what extent?

1. Introduction of ACE Reforms

To address this question, we study the introduction in Italy and Belgium of a so-called *Allowance for Corporate Equity* (ACE) in 2002 and 2006, respectively. Under most corporate income tax systems, interest payments on debt are tax-deductible, while the return on equity is not. This asymmetry favors debt over equity as a means of funding investment, which may lead to excessive leverage. The objective of the ACE is to establish symmetry in the firm-level tax treatment of debt and equity. More precisely, it allows firms (and also banks) to deduct a notional interest on the book value of part or all of their equity from their taxable income. Although the ACE has immediate and direct cost in terms of foregone tax revenue for the government, it may also yield tangible benefits through: (1) the debt-equity substitution and the consequent reduction in the deductibility of interest costs on debt; (2) improved financial stability, especially because financial institutions are less heavily leveraged; and (3) an expansion in bank lending. Estimating the effect of the ACE on bank lending is therefore key to assessing its overall impact.

The ACE in Italy

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In December 1996, a comprehensive tax reform, including an ACE mechanism, was unveiled by the Italian government. Financial firms, i.e. banks and insurance companies, which were initially not covered by the ACE, were included beginning in 2000.

The 1996 tax reform implemented an ACE-type mechanism called the *Dual Income Tax*. This ACE was designed to reduce the tax burden on equity-funded investment by taxing a given notional return on equity at a reduced rate of 19% rather than the standard corporate tax rate of 37%. This *Dual Income Tax* was therefore equivalent to a partial ACE scheme. The notional rate started off at 7%, and was applied to the book value of new equity, benchmarked at 1996. The resulting average rate of tax on profits could not fall below 27%.[2]

The reform was extended to banks and insurance companies in 2000, while converging to a system in which almost the entire capital stock was covered. The ACE base for banks indeed included new equity at the end of 2000 compared to existing equity at the end of 1996, multiplied by 1.2. In 2000, the tax reform as applied for banks was therefore very close to a full ACE.

After the 2001 elections the ACE was progressively phased out. In 2002, the book value is cut again to 100%, only equity increases up to June 2001 were taken into account, the notional interest rate was decreased to 3.5\%, and the corporate tax rate was lowered from 37% to 33%. Apparently, one of the reasons why the new government undid the reform was that tax revenue dropped following the 1996 tax reform, for which the ACE is considered to be the chief culprit (see Guerra, 2002).

The ACE in Belgium: 2006

Belgium, in 2006, introduced an ACE tax reform that allowed all corporations, including financial institutions, to deduct notional interest on equity from taxable income. This notional interest was equal to the product of the book value of equity times a benchmark rate based on the average rate on 10-year bonds in the year preceding the fiscal year and with some restrictions. In each year, the rate could not exceed the rate applied in the previous year by more than 1 percentage point, and it could never surpass 6.5% until 2011 and 3% thereafter (Zangari, 2014; Schepens, 2016).[3] No investment in tangible or intangible assets was required to benefit from the allowance. Finally, the Belgian ACE applied to resident companies and non-resident companies with a permanent establishment or ownership of real estate in Belgium.

The reform was passed two years after the European Commission put an end to a unique Belgian fiscal advantage for subsidiaries of non-Belgian multinationals, the *coordination center* regime created in 1983.[4] The objective of the *coordination center* regime was to attract profitable

[2] The 1996 tax reforms had another component: the so-called "local income tax," levied on profits at a flat rate of 16.2%, was replaced by a new value-added tax called *Imposta Regionale sulle Attivita' produttive* featuring a very broad tax base and a low tax rate of 5.4%.

[3] The ACE rate was equal to 3.442%, 3.781%, 4.307%, 4.473%, 3.80%, 3.425%, 3% and 2.742% in 2006, 2007, 2008, 2009, 2010, and 2011, respectively

[4] The European Commission outlawed this fiscal regime on February 17, 2003.

service centers, known as *coordination centers*, with inexpensive cost structures. These *coordination centers* were specialized in financial, accounting and administrative services, and benefited from a fixed tax rate, ranging from 4% to 10%, based on expenses less financial and salary costs rather than on profits. This fiscal advantage turned Belgium into a popular destination for a significant number of *coordination centers*.

The fear of losing profit centers to other countries following the abolition of the *coordination center* regime in February 2003 lead to the 2006 ACE tax reform. This reform was approved by parliament in June 2005 and implemented in July 2006. The introduction of the ACE coincided with the elimination of a 0.5% tax on new equity issuance, but the economic impact of this concurrent elimination was only minor when seen against the recurrent tax benefits from the ACE.

Possible Effects on Lending

How can a decrease in the cost of equity through an ACE impact bank lending? Three different mechanisms are potentially at play. First, the tax breaks for notional interest on equity generate additional income that banks can directly lend to firms; we refer to this as the *income effect*. Second, subsidizing equity should result in a lower total cost of capital, therefore leading to a decrease in the cost of funds for banks, and hence in lending rates. Lending may then increase if more projects become profitable. This is the *cost of funds* effect. Finally, decreasing the relative tax advantage of debt may induce banks to hold more equity, thereby relaxing the regulatory constraints on equity ratios and allowing them to lend more, the *capital structure effect*. Whereas the income effect should be rather small, the magnitude of the cost of funds or capital structure effects could be large. In the end, whether a reduction in the fiscal cost of equity expands lending and, if so, what mechanism is at play, is the empirical question we are seeking to answer.

2. Methodology

We study the impact on local bank lending of ACE reforms that occurred abroad but that "treated" only a subset of local lending banks in Germany. We focus on loans in Germany to pinpoint how the reforms impacted on bank lending. We surmise that credit demand in Germany neither caused or influenced any of the reforms we investigate.

Data

We access the German credit register, which initially includes *all* large bank-firm exposures of €1.5 million or more. We study the entire 1994-2013 period and, for identification purposes, restrict the sample to firms that borrowed at least once during this sample period from banks headquartered in two different countries, including Germany (given this and other imposed identifying restrictions and the resultant focus on firms in Germany with multiple banks of different nationalities, the aforementioned exposure hurdle is probably not binding). Our final sample comprises 6 Italian banks, 4 Belgian banks and 3,525 German banks and, for each shock, always contains more than 100,000 bank-firm exposures.

Identification Strategy

We follow a difference-in-differences approach, in which we compare, before and after each reform, lending to the same firm by treated banks versus control banks. We analyze both the changes in committed credit volume (i.e., the intensive margin) and the likelihood that a new loan is granted (i.e., the extensive margin). Across specifications, and in addition to comprehensive sets of fixed effects, we also control for various bank and bank-firm relationship characteristics.

3. Results

Our estimations are lined up as follows. First, we show that banks increase equity ratios within two years after the introduction of the ACE, both in Italy and in Belgium, and, most importantly, that the effect is reversed when the reforms are ended. We obtain this result using a subsample of matched banks based on observable pre-reform characteristics.

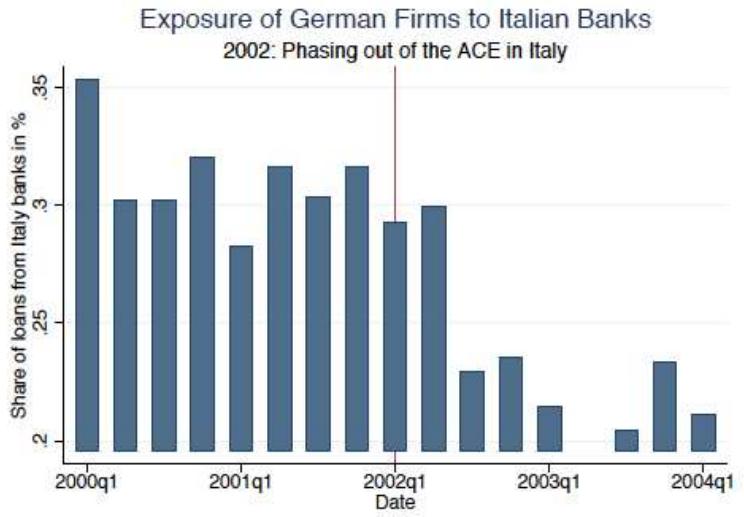
Second, we find that treated banks expand lending abroad when the cost of equity decreases, and that the converse is true when the relative cost of equity increases. Figure 1 shows the (non-conditional) evolution of German firms' percentage exposure to Italian banks in the years around the introduction of the ACE in Italy in 2000. The introduction of the ACE seems to be indeed followed by an increase in lending by Italian banks. The graph plots the percentage share of lending by Italian banks to German firms from our sample every quarter from 1998 to 2001. The red line corresponds to the introduction of the ACE in Italy. Running conditional regressions confirms our results.

Figure 1. Evolution of German Firm Exposure to Italian Banks around the Introduction of the ACE for banks in Italy in 2000

This figure shows the evolution of the relative exposure of German firms to Italian banks over the 1998-2001 period. The red vertical line corresponds to the introduction of the ACE for banks in Italy in 2000. The relative exposure is computed as the ratio of loans from Italian banks to loans from other banks (in volumes).

Conversely, Figure 2 suggests that the phasing out of the ACE reform in Italy had a strong negative effect on Italian banks' lending to German firms.

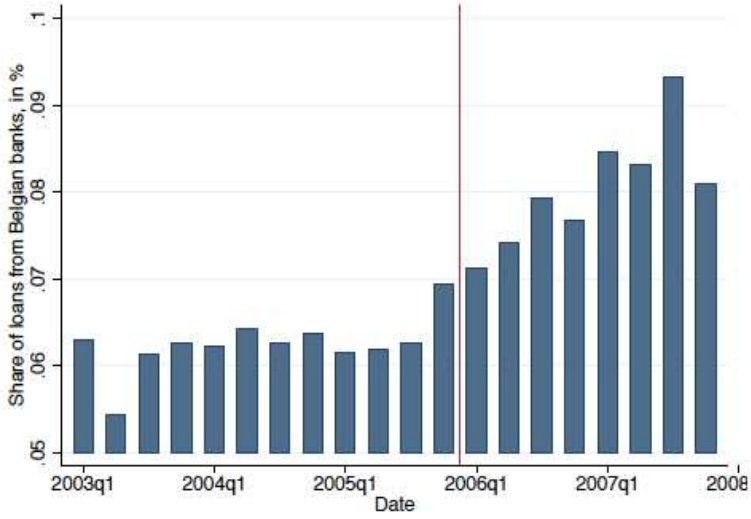
Figure 2. Evolution of German Firm Exposure to Italian Banks around the Phasing out of the ACE in Italy (2002)



This figure shows the evolution of the relative exposure of German firms to Italian banks over the 2000-2004 period. The red vertical line corresponds to the beginning of the phasing out of the ACE in Italy starting from 2002. The relative exposure is computed as the ratio of loans from Italian banks to loans from other banks (in volumes).

Finally, the introduction of the ACE in Belgium in 2006 also had a major impact on lending by Belgian banks to German firms, on both the intensive and extensive margins, as Figure 3 shows. Because this tax reform took place in the cleanest possible setup (Panier, 2013; Schepens, 2014) the large magnitude we observe confirms the results from the previous analyses based on the Italian ACE.

Figure 3. Evolution of German Firm Exposure to Belgian Banks around the introduction of the ACE if Belgium in 2006



This figure shows the evolution of the relative exposure of German firms to Belgian banks over the 2003-2007 period. The red vertical line corresponds to the introduction of the notional interest deduction in Belgium in 2006. The relative exposure is computed as the ratio of loans from Belgian banks to loans from other banks (in volumes).

The large magnitude of our results suggests that the effect is driven not only by a pure income effect, but also by the fact that equity is a binding constraint in lending. More precisely, Italian and Belgian banks increased lending to German firms on the intensive margin by more than 40% relative to other banks. On the extensive margin, the increase in the probability of granting a new loan is less significant, but up to 6 percentage points for Belgian banks following the introduction of the ACE in Belgium.

In a salient robustness exercise, we also benchmark our findings using the introduction in 2000 and modification in 2005 of dynamic provisioning in Spain. Dynamic provisions are forward-looking: Before any credit loss on an individual loan is recognized, a buffer (i.e. the dynamic provision fund) is built up from retained profits in good times to cover the realized losses in bad times (i.e. when specific provisions surpass their formula-based average over a credit cycle). Hence, dynamic provisions represent counter-cyclical capital buffers to be used in crisis times.
An important feature of this exercise is that we know the findings for domestic bank lending in Spain (Jiménez et al., 2014): The introduction of dynamic provisioning substantially reduced bank lending, while its modification increased it . We observe similarly signed but larger volume effects in lending by Spanish banks in Germany, corroborating our findings for changes in the cost of equity as a consequence of the tax reforms in Italy and Belgium.

4. Contribution to the Literature

This paper contributes to the literature that seeks to identify the impact of bank capital regulation on bank lending. Whereas the existing literature has focused on the impact of an increase in capital requirements (Aiyar et al., 2014; Fraisse et al., 2015; Behn et al. 2016), we investigate the effect of a decrease in the cost of equity. The effects we find are strong. We therefore contribute

to the debate on optimal capital regulation by being the first to demonstrate that a lower cost of equity can increase both bank equity ratios and bank lending. Our results are also related to the debate on whether or not equity is cheap for large financial institutions (Gandhi 2016; Baker 2015).

By looking at the impact of changes in regulation abroad, we better control for the inevitable endogeneity in regulation. We also find that the effects of changes in capital regulation abroad are amplified. In this way, our paper also adds to the literature on cross-border banking. Ongena et al. (2013) show that tighter bank regulation is associated with lower lending standards abroad. Aiyar et al. (2014) analyze the impact of changes in UK regulation on lending of UK banks to foreign countries and find that, for every increase in the requirement of 100 basis points, the growth rate of cross-border lending is reduced by 5.5 percentage points. We substantially extend their analysis by looking at multiple shocks in capital regulation abroad (in Italy and Belgium) and domestic bank lending (in Germany) and by controlling better for credit demand with firm fixed effects.

Finally, our study complements the literature on the impact of taxes on bank decisions. Schepens (2016), Keen et al. (2012), Gu et al. (2015) and Gambacorta et al. (2016) study the effect of tax reforms on bank capital structure. Schepens (2016) in particular investigates the effect of the introduction of the ACE on the capital structure of Belgian banks. As far as we know, this paper is the first in the literature to look at the effect of taxes on bank lending while controlling for demand.

5. Conclusion

We study the impact of shocks to the cost of bank equity that occurred abroad but that treated only a subset of local lending banks in Germany. Using a difference-in-differences approach, we compare lending to the same firm by treated banks versus untreated banks before and after each shock. The introduction of an ACE, which decreases the cost of bank equity, leads to a large expansion in bank lending.
The magnitude of the effect is large, which suggests that bank lending is very sensitive to the cost of equity.

Our paper contributes to the debate on bank capital regulation by investigating the effects of an ACE. Its objective is to establish whether the positive effect on lending and financial stability can compensate for the fiscal cost of this reform.

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